TECHNOLOGIEN MIT
VORSPRUNG

# is HRT USB
# is HRT USBeX

**User Manual**

ifak system

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# Contents

## Chapter 1: Hardware Installation

Introduction . . . . . 1
Documentation . . . . . 3
Our Service . . . . . 3
Certificates . . . . . 4
EMC Certificate . . . . . 4
EMC Certificate of Conformity for "is HRT USB" . . . . . 4
EMC Certificate of Conformity for "is HRT USBeX" . . . 5
ATEX Certificate for "is HRT USBeX" . . . . . 6
PC Connection . . . . . 7
System Requirements . . . . . 7
Delivery Contents . . . . . 7
Technical Data . . . . . 8
Installation . . . . . 9
Steps of Installation . . . . . 9

## Chapter 2: Software Installation and Configuration

Software Installation . . . . . 11
Installation under Windows NT 4.0 . . . . . 12
Installed Files . . . . . 13
Configuration Software . . . . . 15
Add a Device . . . . . 16
Device is HRT USB/is HRT USBeX . . . . . 16
Configuration under Windows NT 4.0 . . . . . 17
Empty-Slot . . . . . 18
Remove a Device . . . . . 18

# CHAPTER 1:
# HARDWARE INSTALLATION

## Introduction

The advantages of the Universal Serial Bus (USB) combined with the operational range of HART: these practically orientated features turn the device is HRT USB in a state of the art fieldbus component. Desktop PCs as well as notebook devices without HART interfaces can be made HART nodes within seconds based on the plug & play features of USB. The device is bus powered, thus not depending on external power connections.

*Figure 1: The HART interface is HRT USB*

For the use in hazardous areas we deliver an intrinsic safe, ATEX certified version: is HRT USBeX. It is functionally equivalent to the standard type is HRT USB. All information given in this doc-

umentation refer to both device types, otherwise a particular type is named specially.

*Figure 2: The intrinsic safe interface is HRT USBeX*

The interface supports the transmission speed of 1200 bit/s and can work as primary Master as well as secondary Master. The interface is available with opto-isolation to the HART network. The device comes with a Windows DLL which allows the easy integration of the modem into any applications.

The device can work like a serial modem under the operation systems Windows 2000 and XP. Therefore it offers a serial COM-port so that already existing applications can be used without any changes.

Optionally a device type manager (DTM) compliant to the current version 1.2 of the FDT specification is delivered. It works like a device driver witch allows the communication between devices on the HART bus and their DTMs. With the help of the DTM the start-up process of the HART bus can be done easily.

## Documentation

This documentation contains important information for the secure and correct operation of the interfaces is HRT USB and is HRT USBeX. Please read this documentation carefully before using the device.

Throughout the manual different fonts are used to indicate different meanings. A short explanation can be found below:

| | |
|---|---|
| `Courier New:` | file names, code sequences |
| Arial: | names, commands, remarks |

## Our Service

In case you have any questions which can't be solved by this manual, please contact our service by phone, fax or e-mail.

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# Certificates

## EMC Certificate

### EMC Certificate of Conformity for "is HRT USB"

We the producers

ifak system GmbH
Oststrasse 18, D-39114 Magdeburg,

certify hereby that the product is HRT USB meets the protection requirements of the European Union council directive of 3 May 1989 on the approximation of the laws of the Member States relating to the electromagnetic compatibility (89/336/EEC).

| | |
|---|---|
| Tested according to: | EN55022 Class B and EN55024 |
| Serial no.: | 2000 - 3999 |

Changes or modifications not approved by ifak system void the validity of the declaration.

A copy of the signed Certificate of Conformity can be requested at the above address.

## EMC Certificate of Conformity for "is HRT USBeX"

We the producers

ifak system GmbH
Oststrasse 18, D-39114 Magdeburg,

certify hereby that the product is HRT USBeX meets the protection requirements of the European Union council directive of 3 May 1989 on the approximation of the laws of the Member States relating to the electromagnetic compatibility (89/336/EEC).

| | |
|---|---|
| Tested according to: | EN55022 Class B and EN55024 |
| Serial no.: | 4000 - 5999 |

Changes or modifications not approved by ifak system void the validity of the declaration.

A copy of the signed Certificate of Conformity can be requested at the above address.

# ATEX Certificate for "is HRT USBeX"

The interface type is HRT USBeX has been tested for the use in potentially explosive atmospheres according to the Directive 94/9/EC.

A TÜV CERT Certification Body has certified that the type meets the provisions of the Directive in the essential health and safety requirements for the conceptional design and manufacturing of equipment, protection systems and devices set out in Annex II of the Directive, account being taken of their intended use in potentially explosive atmosphere.

The EC equipment type examination number is
**TÜV 04 ATEX 2503**.

The interface type was tested according to
EN 50014:1998 + A1 + A2 and EN 50020:2002.

On the product following information must be given:

# PC Connection

## System Requirements

To connect the interface is HRT USB or is HRT USBeX with your computer an available USB port is required. The operating systems Windows 9x, ME, NT 4.0, 2000 and XP are supported.

## Delivery Contents

The interfaces are delivered with user manual and driver software on CD.

Driver for the operating system Windows NT 4.0 is delivered only on request.

# Technical Data

*Table 1: Hardware capabilities*

| Hardware | |
|---|---|
| **HART** | |
| Modem Chip is HRT USB | H&B 0743849 |
| Modem Chip is HRT USBeX | HT 2012 |
| Connector | 2 pin test clips |
| Transmission speed | 1200 bit/s |
| Maximal output values | $U_o$: 1,0 V; $I_o$: 7 mA; $P_o$: 7 mW |
| Test voltage of opto-isolation | 3 KV |
| **USB** | |
| Connector | 1 device connector |
| Input values | $U_{in}$: 5 V +/- 10 % (max. 5,5 V)<br>$I_{in}$ max: 200 mA; $P_{in}$ max: 1 W<br>$U_m$: 253 V |
| Transmission speed | 12 Mbit/s |
| Operation | up to 16 devices in parallel |

*Table 2: Software capabilities*

| Driver | |
|---|---|
| Interfaces | DLL |
| Operating systems | Windows 9x, ME, 2000, XP;<br>Windows NT 4.0 on request |

Attention: Product changes which are not approved by ifak system result in a voidness of the Certificate of Conformity.
**Intrinsic safe device:** Only the HART connector (test clips) can be led into the explosive area. The device is HRT USBeX can't

never be used in a potentially explosive area.
An unauthorised opening of the device expires the operating license for the use in explosive area.

# Installation

## Steps of Installation

1. Driver installation
   The driver software has to be installed **before** the hardware installation. Otherwise the operating system can't find the respective driver.
2. Under Windows NT 4.0 reboot the PC
3. Interface installation
4. Configuration

The interface can be connected to the HART network with the pin test clips directly. With the integrated USB cable the interface can be connected with the PC/notebook.

The green LED indicates the actual operating mode. It flashes during the start-up/reset process. After the end of the reset process the LED should darken again.

# CHAPTER 2:
# SOFTWARE INSTALLATION AND CONFIGURATION

## Software Installation

The driver software has to be installed **before** the hardware installation. Otherwise the operating system can't find the respective driver.

The driver software package is HRT Multidriver contains a Dynamic Link Library (DLL) which allows the access to the HART firmware under the operating systems Windows 9x, ME, NT 4.0, 2000 and XP. The actual operating system is detected automatically by the driver DLL.

The configuration of the interface can be done fast and easily with the configuration software is HRT Driver Configurator which is installed into the ifak system directory of the Start Menu.

The software comes on CD-ROM. The installation follows the steps mentioned below:

- Login as administrator under the operating systems Windows NT 4.0, 2000 and XP.
- Insert the installation CD-ROM into your CD drive.
- The setup starts with an autoroutine; proceed according to the instructions displayed on the screen.
- The software is installed in the default program directory of your computer under the subdirectory
  *ifak system\is HRT Multidriver *

# Installation under Windows NT 4.0

For a correct operation of the device, it is necessary to install the driver software including the NT 4.0 USB stack, to configure the hardware, and to reboot the PC only in the order subsequently described.

1. Install the driver software (setup)
2. Boot the PC
3. Start the configuration program is HRT Driver Configurator and change the device settings according to your hardware
4. Close the configuration program
5. Reboot the PC

# Installed Files

Depending on the operating system the following files are installed on your computer:

*Table 3: Installed files*

| | |
|---|---|
| **DLL:** | |
| isHARTdrv.dll | the Dynamic Link Library providing access to the firmware (driver DLL) |
| isHARTdrv.lib | the corresponding library for C/C++ environments |
| **INC:** | |
| isHARTdrv.h | definition of software interface and error codes |
| **USB Driver:** | |
| nt4\isHARTusbNT4.sys | provides the access to the USB stack under Win NT 4.0 |
| W2000\isHARTusb.sys | provides the access to the USB stack under Win 2000 and XP |
| W2000\isHARTusbW2000.inf | installation information for Win 2000 and XP |
| W98\isHARTusb.sys | provides the access to the USB stack under Win 98 and ME |
| W98\isHARTusb.inf | installation information for Win 98 |
| **USB Stack:** | |
| NT 4.0 USB Extension* | provides USB support for NT 4.0 |
| **Configuration Software:** | |
| bin\HARTDriverConfig.exe | Setup Program |

** NT 4.0 USB Extension © 1996-2000 BlueWater Systems, Inc*

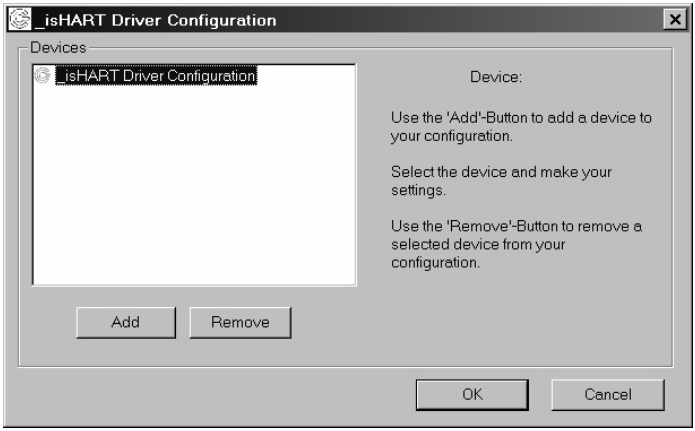
# Configuration Software

The configuration software is HRT Driver Configurator is provided in order to adapt the DLL access to your hardware. It is installed in the Start Menu.

This dialog based application allows the easy addition and removal of HART interfaces. It also checks the available resources of the system.

A device number is assigned to each USB interface which enables the software to address it. Empty devices can be included in order to allow gaps in the enumeration of devices; see section Empty-Slot.

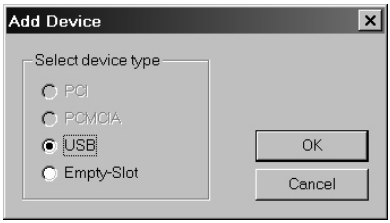
*Figure 3: Configuration program: add and remove devices*



# Add a Device

Please press the button `Add`, choose the device type you would like to add. Then make your settings.

*Figure 4: Configuration software: add a device*



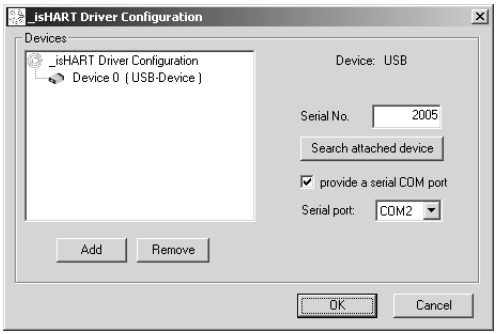

## Device is HRT USB/is HRT USBeX

The device possesses an unique **serial number** for clear identification. The number is located on the downside of the case. The configuration software offers the possibility to search automatically for all attached devices and to detect their serial numbers. Please fill in the number in the intended field.

The device can work like a serial modem under the operating systems Windows 2000 and XP. Therefore it offers a serial COM-port so that already existing applications can be used without any changes.

The serial COM-port can be selected. The configuration software checks the available COM-ports to avoid an address conflict.

*Figure 5: Configuration software: select a serial COM-port*



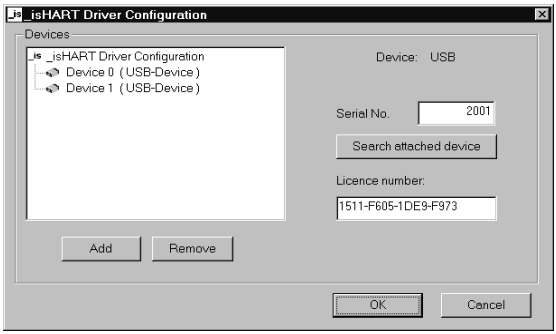

If you are working under Windows 98, ME, XP or 2000 just fill in your settings and end with `OK`.

## Configuration under Windows NT 4.0

For licence reasons the using of the USB driver stack under NT 4.0 is protected by a **licence number***. The licence number is only valid for that single device.
The number is put down on the **inside** of the documentation.

** NT 4.0 USB Extension © 1996-2000 BlueWater Systems, Inc*

*Figure 6: Configuration software: input of serial and licence number*




When adding a device **for the first time** under Windows NT 4.0 the program checks whether the driver software has been

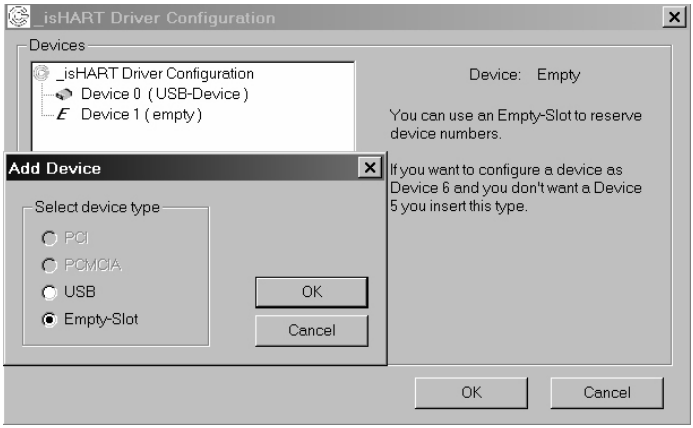
installed correctly and then enables the stack functionality. Therefore it is necessary to reboot the PC.

Under the operating system Windows NT 4.0 the device can **not** work as a serial modem.

### Empty-Slot

The empty device does not contain any resources. It serves as a substitute for device numbers not yet assigned. Using empty-slots enables a free enumeration of devices by inserting empty devices between existing ones.

*Figure 7: Configuration software: add an empty slot*




## Remove a Device

Mark the device you wish to remove and press the button `Remove`.